

HOW TO CARE
FOR YOUR
HEATING PLANT



AMERICAN
RADIATOR & *Standard*
Sanitary
CORPORATION

40 West 40th Street
New York

Bessemer Bldg.
Pittsburgh, Pa.

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IMPORTANT

This book contains instructions for getting the best results from your heating apparatus.

Please note the name of your heating contractor in space below, and then hang up the book in a convenient place for handy reference.

* * *

Note Here Name of Your Heating Contractor

Name.....

Address.....

Phone No.....

Call on the heating contractor who installed and guaranteed your plant, regarding any question or difficulty that might develop. The manufacturer guarantees all products against defects in fabrication, but their correct installation, and computation of proper sizes, etc., is the responsibility of the contractor to whom the work is entrusted.

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Firing Instructions

ANTHRACITE COAL

Starting the Fire:

Start the fire with kindling, then cover entire grate with a thin layer of coal. When this is well ignited fill firepot with coal to level of fire door in the front, and bank fuel up at the rear. Always maintain a deep fuel bed for most economical results.

Severe Weather:

Keep firepot full of coal and run heater by Arco Automatic Steam Regulator or Automatic Water Regulator (if so equipped). These control the dampers (see pages 15, 16, 17 and 18). When tending the boiler also thoroughly clean the grate by shaking until glowing coal drops into ash pit. *Never disturb fire from the top when using anthracite.*

Mild Weather:

Keep two to six inches of ashes between live coals and grate. Fill firepot as mentioned above and set automatic regulator or hand control to keep fire subdued. Run poker or slicing bar through slice door (see page 15) over the grate at times, instead of stirring up the fire by shaking the grate. As weather grows colder, reduce amount of ashes on the grate.

Night Firing:

In very cold weather when house should be kept warm all night, clean grate so it is covered with clear-burning, red-hot coals late at night. Then fill firepot full of fuel. Full pot and deep fire burn least coal—plenty for night heating and some left to commence early in the morning, when the resulting comfort is best appreciated. Heat is most needed at time of getting up and starting the day.

Turn off radiators in rooms where heat is not wanted. The

regulator will automatically control the dampers so that just the proper amount of steam or warm water is supplied to the radiators which are turned on. Or in the case of water boiler not equipped with automatic regulator, set hand control to maintain required degree of heat.

Early Morning Fire:

If fire is low on mild weather mornings, first open draft damper in ashpit (see pages 15 and 18) and allow fire to brighten up before adding fuel. Then spread a thin layer of fresh coal and set drafts for brisk fire. After well started, add usual fuel charge. Do not shake much at this time.

In severe weather, if boiler has been attended to as directed in Night Firing, draft can be turned on early in the morning and boiler run awhile before adding coal. It will usually be found best to shake the fire at this time, increase the draft and let boiler thoroughly heat up the whole house before feeding the usual fuel charge. A large quantity of cold fuel naturally cools the fire and requires some time to become well ignited.

A fire well cared for, and normal attention given to the control of the boiler to suit weather conditions, will amply reward by fuel saving and heating comfort.

Sizes of Coal to Use:

For an average draft, the most satisfactory results will be obtained with stove size anthracite. If a strong draft is available better results will be obtained with a smaller sized coal or by firing with large size coal a proportionate amount of chestnut or pea coal. Should it be desired to burn buckwheat or pea coal, it is well to have a supply of larger sized coal on hand for use when building new fires.

After building a new fire with buckwheat or pea coal, the fuel bed should be increased in thickness, by the addition of small charges, until level with the fire door. When firing fuel of this type, the bright fuel should be pushed to the rear of the boiler, leaving a hollow in which to throw the fresh fuel. This method

will leave glowing coal exposed to ignite gases of distillation.

The use of buckwheat and pea coal is economical but requires a very good draft. The grates should be carefully shaken only until the first live coals fall through them, in order to avoid excessive fuel waste.

SOFT COAL

(WITH ORDINARY TYPE OF BOILERS)

Starting the Fire:

Start the fire with kindling, and cover entire grate with a thin layer of coal. When fuel is burning briskly add coal in small amounts. In this manner the fuel bed is gradually built up, and when the fuel is thoroughly coked, the boiler is ready for recharging.

Recharging:

Soft coal should never be fired over the entire fuel bed, but should always be so distributed as to leave a portion of the glowing coked coal exposed to ignite the gases of distillation. By this method, together with proper air supply, dense smoke from the chimney will be eliminated and more efficient operation obtained.

When recharging a boiler, then, it will be necessary to push the glowing coked coal to the rear, leaving only a thin layer covering the front grates, thus forming a hollow in which to throw the fresh fuel. It is recommended that the fuel bed be carried as deep as the size of the fuel and the available draft will permit, in order to have as much coked fuel as possible which, as outlined, shall ignite the gases driven off from the fresh coal. A deep fuel bed also insures long firing periods.

Immediately after firing, air should be admitted over the fuel bed, by opening the secondary air slots in the fire door. If too much air is admitted the gases driven from the soft coal will be cooled below the ignition temperature and smoke will be generated. Open slots only as far as necessary to obtain a smokeless combustion of the gases above the fuel bed.



SLOTS IN FIRE DOOR

CLEANING THE FIRE

The fire is best cleaned when it is low. To remove clinkers, push fuel first to one side and then to the other. If the fuel used is of the caking variety it will fuse into a solid mass and may be broken up by stoking, about one hour after firing, the time interval depending on the operating conditions. Care should be taken when stoking not to raise the ash into the fire as clinkers will be formed. The stoking bar should be kept as near grate as possible and only raised sufficiently to break up the fuel.

Severe Weather:

Keep firepot full of coal and run heater by Automatic Steam Regulator or Automatic Water Regulator (if so equipped). These control the dampers (see pages 15, 16, 17 and 18). When tending the boiler thoroughly clean the grate by shaking until glowing coal drops into ash pit.

Mild Weather:

Keep two to six inches of ashes between live coals and grate. Fill firepot full of fuel and set automatic regulator or hand control to keep fire subdued. Run poker or slicing bar through slice door (see page 15) over the grate at times, instead of stirring up the fire by shaking the grate. As weather grows colder, reduce the amount of ashes on the grate.

Night Firing:

In very cold weather when house should be kept warm all night, clean grate so it is covered with clear-burning, red-hot coals late at night. Then fill firepot full of fuel. Full pot and deep fire burn least coal—plenty for night heating and some left to commence early in the morning, when the resulting comfort is best appreciated. Heat is most needed at time of getting up and starting the day.

Turn off radiators in rooms where heat is not wanted. The regulator will automatically control the dampers so that just the proper amount of steam or hot water is supplied to the radiators which are turned on. Or, in the case of water boiler not equipped with automatic regulator, set hand control to maintain required degree of heat.

Early Morning Fire:

If fire is low on mild weather mornings, first open draft damper in ashpit (see pages 15 and 18) and allow fire to brighten up before adding fuel. Then spread a thin layer of fresh coal and set drafts for brisk fire. After well started, add usual fuel charge. Do not shake or slice much at this time.

In severe weather, if boiler has been attended to as directed in Night Firing, draft can be turned on early in the morning and boiler run awhile before adding coal. It will usually be found best to shake the fire at this time, increase the draft and let boiler thoroughly heat up the whole house before feeding the usual fuel charge. A large quantity of cold fuel naturally cools the fire and requires some time to become well ignited.

A fire well cared for and normal attention given to the control of the boiler to suit weather conditions, will amply reward by fuel saving and heating comfort.

Sizes of Coal to Use:

For an average draft, the most satisfactory results will be obtained with lump or egg size coal. The smaller sizes down to No. 2 washed nut may also be used, but will require a strong

draft. The size fuel which will give satisfaction in the greatest number of instances is 3 x 6 inch egg. This size allows free access of air to the burning coal. When burning soft coal it will be necessary to clean the flues of the boiler more frequently in order to obtain most economical operation.

Soft coal burns more rapidly and with less draft than anthracite but will require more frequently attention. Soft coal burns unevenly and when fired in thin layers will form holes in the fire, which reduces the draft. Deep fuel bed should be carried.

SOFT COAL

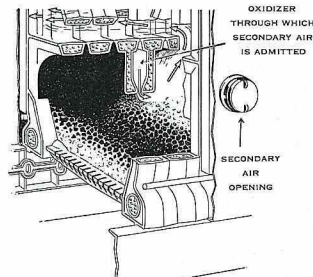
(SMOKELESS BOILERS—WITH OXIDIZER)

Starting the Fire:

Start the fire with kindling, and cover entire grate with a thin layer of coal. When fuel is burning briskly add coal in small amounts. In this manner the fuel bed is gradually built up, and when the fuel is thoroughly coked, the boiler is ready for recharging.

Recharging:

When recharging smokeless boilers equipped with an Oxidizer, push glowing coal to the rear of the boiler underneath the Oxidizer, leaving only a thin layer on the front grates. A sufficient quantity of fresh coal to provide a good coal bed should now be fired in the boiler but care should be taken to leave a space of at least three inches beneath the Oxidizer.



Never fire fresh coal behind the Oxidizer.

Secondary air must now be admitted from both sides of the boiler until a smokeless combustion of the gases is obtained.

Secondary Air:

After adding fresh fuel, considerable combustible gas rises from the fuel bed, and if sufficient air for its complete combustion cannot be supplied through the grates (primary air), air must be admitted through fire door slots and secondary air openings at the side of the boiler (see illustration page 9). The amount of secondary air to be supplied will vary with the type of coal used and the rate of combustion.

The addition of too much secondary air is harmful rather than beneficial. The correct adjustment of fire door slots and side dampers depends upon so many variables that no set rules can be given. However, the following may be helpful:

In mild weather keep secondary air openings closed, whereas, for average winter weather, openings should be partially opened. In extreme winter weather when the boiler is running at a high rate, it is advisable to keep them half open all the time. At all times immediately after firing, the secondary air openings should be opened full for about one hour, the time depending upon the rate of combustion.

Additional Care:

Follow in general the directions given under "Soft Coal with Ordinary Type of Boilers," page 6, for attention in mild and severe weather, early morning firing, etc., and also follow detailed instructions that are furnished with the boiler.

COKE

Coke as manufactured is suitable and can be used in IDEAL Boilers with good results. It has little ash and gives uniform, steady heat. Due to its lighter weight for an equivalent volume, as compared to anthracite, the attention period will be shorter unless a boiler is provided with a larger firebox.

Particular care must be exercised when burning coke to see that no air leaks exist where boiler base sets on floor and where boiler proper sets on base, also that all doors fit properly, and that draft damper (in base) (see illustration pages 15 and 18) closes tightly so that air supply to fire can be completely controlled.

Less shaking of grates is required and draft requirements are less than those of anthracite.

Always carry firepot full. A shallow fire results in quick combustion and the formation of clinkers.

Otherwise proceed as with anthracite coal.

GENERAL FIRING INSTRUCTIONS

(All Fuels)

1. Carry deep or high fire—keep pot full. Let the coals come up to feed-door, and higher, as it slopes back. Do not nag the fire by frequent feeding in dribbles, or frequent poking or shaking throughout the day. Feed, shake or clear grate at regular intervals.

2. When shaking or firing, Choke Damper (inside smokehood or smoke-pipe) should be open. Check-Draft Damper or Cold Air Check, and Draft Damper (in base) should be closed. (See illustrations pages 15 and 18.) These precautions will concentrate the draft upon fire-door and prevent escape of dust and gas into the cellar.

3. To increase or lessen the pressure of a steam boiler or to increase the temperature of the water in a water boiler that is equipped with automatic regulation, move the weights on the regulator arm (see pages 15, 16, 17 and 18), so that the draft damper closes at the pressure or temperature desired. A little experimenting will show you the correct location of weights. Correct automatic damper control is of greatest importance in obtaining economical operation. (See pages 18 to 22.)

4. Do not leave fire door (see pages 15 and 18) open in order to check fire (at any time). Correct adjustment of the damper or

If pressure type system is used, make certain it is functioning properly and that relief valve discharges at proper pressure. (See manufacturer's instructions.)

SMOKEPIPE

Be sure smokepipe connections are tight and that its joint with the chimney is sealed.

Be sure that smokepipe enters the chimney proper, but does not extend too far as such a condition will cut off part of the chimney flue area and decrease the draft. (See paragraph, "The Chimney," page 24.)

AUTOMATIC DAMPER REGULATOR

Make certain that automatic damper regulator is functioning properly. (See "Adjustment of Arco Automatic Regulators," page 18, for instructions.)

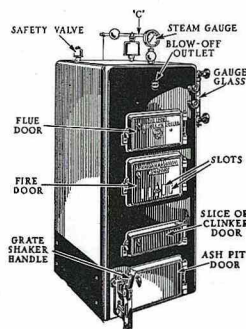
LEAKAGES

Examine boiler for air leaks. Note if base of boiler where it rests on floor has been properly cemented. Ascertain if space between sections and base has been properly sealed with boiler putty. Be sure that doors fit tight to frame. This is important. Probably best done by heating contractor.

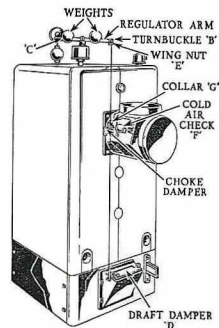
Burning Coal Fast and Slow

Proportionate to the number of radiators turned on or off, the heat supplied by the boiler must vary from a minimum to a maximum, or in other words, the rate of burning coal must fluctuate between fast and slow and adjust itself to the heat demand. In order to do this all jacketed and unjacketed steam boilers, and most jacketed water boilers are controlled by an Arco Automatic Steam or Water Regulator, which operates the base draft damper and cold air check (see illustrations pages 15, 16, 17 and 18) thereby increasing or decreasing the draft. If one or more radiators are turned off the regulator immediately checks the draft and the rate of combustion is decreased and vice versa.

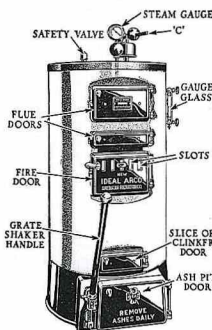
In order to make it easy to identify the various parts of boilers referred to in this booklet, they have been indicated on illustrations below:



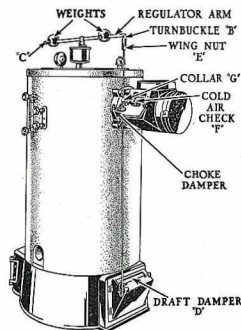
Ideal Redflash Boiler—front view



Ideal Redflash Boiler—rear view



New Ideal Arco Boiler—front view



New Ideal Arco Boiler—rear view

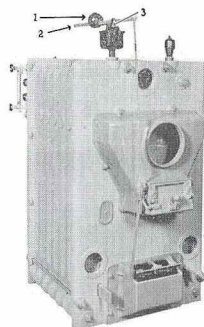


ILLUSTRATION "A"
Ideal Water Tube 23" Boiler
with Automatic Damper
Control

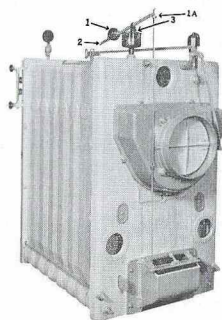


ILLUSTRATION "B"
Ideal Water Tube 29" Boiler
with Automatic Damper
Control

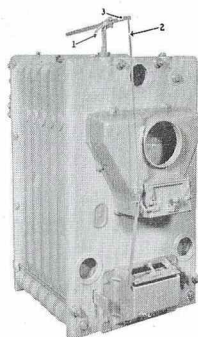


ILLUSTRATION "C"
Ideal Water Tube 23" Boiler
with Hand Damper Control

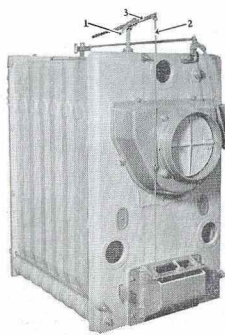


ILLUSTRATION "D"
Ideal Water Tube 29" Boiler
with Hand Damper Control

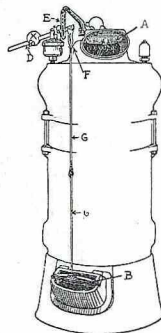


FIG. 1

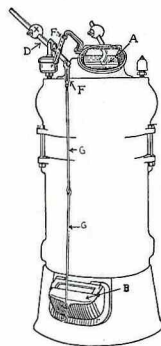


FIG. 2

Ideal Arco Round Boilers with Automatic Damper Control

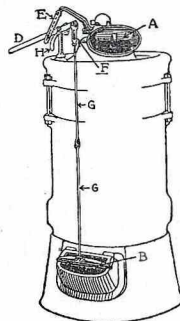


FIG. 3

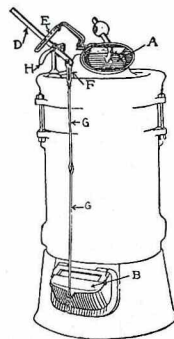
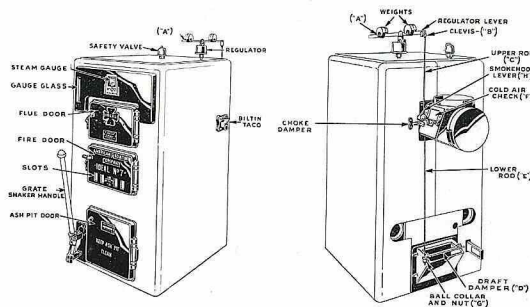


FIG. 4

Ideal Arco Round Boilers with Hand Damper Control



No. 7 IDEAL BOILER

Adjustment of Arco Automatic Regulators

No. 7 IDEAL BOILER

To obtain proper operation of the automatic regulator it should be correctly adjusted.

1. See that notches are on top of regulator arm and that the screw on top of rocker arm is engaged with notch nearest rear of boiler on steam systems and with notch farthest from rear on warm water systems.

2. Adjust counter weights "A" on regulator lever so that front end of lever is down.

3. Adjust upper rod "C" to be $\frac{3}{8}$ " above clevis "B" for steam regulator, and approximately 3" above clevis for water regulator.

4. Move rear end of regulator lever down until cold air check door "F" opens $\frac{1}{16}$ ". Then, with regulator lever still in this position, adjust lower ball collar and nut "G" at draft damper "D" so that the draft damper is just cracked open (about thickness of knife edge). Tighten nut "G".

5. Release rear end of regulator lever so that front end drops to its lowest position. Cold air check "F" must be closed now and draft damper "D" must be open.

6. In case of unusual draft conditions cold air check may be adjusted to open before base draft damper has closed, but in most instances ample and rapid control will be obtained with the adjustment described above.

7. In order to obtain a higher temperature in case of a warm water heating system or higher pressures for a steam system, it is merely necessary to move the weight toward the end of the regulator arm "A". Lower pressures and temperatures will be obtained if the weight is moved toward the post. Experience will soon teach the proper position for the weight or weights furnished with the boiler to maintain any desired pressure or temperature.

Ideal Redflash and New Ideal Arco Round Boilers

(See page 15 for illustration of parts.)

Adjust turnbuckle "B" so that with the front end of the regulator arm "C" completely down, the base draft damper "D" is open about $1\frac{1}{2}$ ". Lock rod in this position with wing-nut "E." Hold base draft damper "D" and cold air check damper "F" closed and adjust collar "G" on rod so that it is just touching cold air check lever—then fasten collar in place with lock screw.

When the regulator has been adjusted, it should function as follows:

With the front end of the regulator arm "C" completely down, the base draft damper "D" should be open and cold air check "F" closed. Now raise regulator arm at "C" until base draft damper "D" closes—at this point cold air check "F" should also be closed. By still further raising arm at "C," base draft damper will remain closed and cold air check "F" will continue to open.

In case of unusual draft conditions cold air check may be adjusted to open before base draft damper has closed but in

most instances ample and rapid control will be obtained with the adjustment previously described.

In order to obtain a higher temperature in case of a warm water heating system or higher pressures for a steam boiler, it is merely necessary to move the weight toward the end of the regulator arm "C." Lower pressures and temperatures will be obtained if the weight is moved toward the post. Experience will soon teach the proper position for the weight or weights furnished with the boiler to maintain any desired pressure or temperature.

Ideal Water Tube Boilers

Steam boilers of these series are equipped with Arco Automatic Regulation (water boilers can be equipped at small extra cost). There are, however, two different arrangements of control mechanism.

On the boiler shown in illustration "A" on page 16 the rods are connected to both draft damper and cold air check and permanently hooked up at time of installation. To control the draft set weight 1 at a point between end of regulator arm 2 and regulator 3 which experience indicates will maintain the desired pressure on steam boilers, or temperature, in the case of warm water boilers. If necessary to change regulation, move weight 1 towards end of regulator arm 2 for higher and towards regulator 3 for lower pressure or temperature.

On the Water Tube Boiler shown in illustration "B," page 16, the rods are connected to lower draft damper only, but the length can be adjusted by turning small screw 1A, moving rod as required and tightening screw.

The proper adjustment is obtained when the end of regulator arm 2 is completely down and the draft damper is in a full open position.

The weight 1 should then be set at a point between end of regulator arm 2 and regulator 3 which experience dictates will maintain proper conditions of pressure or temperature. To change regulation move weight 1 towards end of arm 2 for increase in pressure or temperature, and towards regulator 3 for a decrease.

Ideal Arco Round Boilers

All Arco Round Steam Boilers have Arco Automatic Regulation, and Water Boilers can be equipped at small extra cost. Figures 1 and 2 on page 17 graphically illustrate the hook-up of the Arco Regulator and how it functions.

The regulator arm "D" is connected to the combination check and choke damper "A" by the slotted link "E" and to the draft damper "B" by the jointed rod "G."

Experience will soon teach the proper position for the ball on the regulator arm, in order to maintain desired conditions of pressure and temperature.

To obtain a higher temperature (or pressure for a steam boiler), move ball away from Arco Regulator; and vice versa for lower temperature or pressure.

It will be noted that the jointed rod "G" can be adjusted to the desired length by means of the turnbuckle "F."

The combination check and choke-damper "A" is connected to the regulator arm by means of a slotted link "E," provided with four holes which permit adjustment of the relative positions of damper "A," and draft-damper "B" by changing the connecting bolts from one hole to another in the slotted link "E."

When the unattached end of regulator arm is at its lowest possible position (see Fig. 1), adjustment should be made by means of the turnbuckle "F," to open wide draft-door damper "B."

The unattached end of regulator arm should then be gradually raised until draft-damper "B" just closes, at which point

the slotted link "E" should be so adjusted that damper "A" begins to open.

With the unattached end of regulator arm in its highest position (see Fig. 2), draft-damper "B" should continue to remain closed and damper "A" should be fully opened.

In case of unusual draft conditions, damper "A" can be adjusted to start opening before draft-damper "B" has closed but in most instances ample and rapid control will be obtained with the adjustment already described, particularly if care is taken to prevent air leakage in ash-pit.

Care should be taken to see that draft-damper "B" is always tightly closed when damper "A" is opened to the fullest extent, Figure 2.

Hand Damper Control on Water Boilers

IDEAL WATER TUBE BOILERS

All water boilers of this type have specially designed hand regulation which makes it a simple and easy task to adjust all dampers for proper control of fire. Arco Automatic Regulator may be attached at small extra cost.

One series of Water Tube Boilers has hand regulation as shown in illustration "C," page 16, and operates both the cold air check and draft damper. The other series is arranged as per illustration "D," on page 16, and adjusts the draft-damper only. The choke-damper in smoke-hood is controlled by a long rod with a handle in front of the boiler.

To increase temperature, loosen threaded handle 1 and push up vertical rod 2 and tighten in place. To get less heat loosen threaded handle 1 and pull down vertical rod 2.

Experience will soon teach the proper position of operating lever (3) for all conditions.

IDEAL ARCO ROUND BOILERS

Figs. 3 and 4 on page 17 illustrate the hand draft control of these boilers. Arco Automatic Control may be added at small cost.

The operating lever "D" is connected to the combination damper "A" by the slotted link "E" and to the draft-damper "B" by the jointed rod "G."

To obtain a higher water temperature, pull down end of operating lever "D," and for lower temperature vice-versa. Experience will soon teach the proper settings of operating lever "D" for all conditions.

ADJUSTMENT. It will be noted that the jointed rod "G" can be adjusted to the desired length by means of the turnbuckle "F."

The combination check and choke-damper "A" is connected to the operating lever by means of a slotted link "E," provided with four holes which permit adjustment of the combination damper and draft-damper by changing the connecting bolt from one hole to another.

When the unattached end of operating lever "D" is at its lowest possible position (see Fig. 3), adjustment should be made by means of a turnbuckle "F," to open wide draft damper "B."

The free end of operating lever "D" should then be gradually raised until draft-damper "B" just closes, at which point the slotted link "E" should be so adjusted that damper "A" just begins to open.

With the end of operating lever "D" in its highest position (see Fig. 4), draft-damper "B" should continue to remain closed and damper "A" be fully opened.

In case of unusual draft conditions, damper "A" can be adjusted to start opening before draft-damper "B" closes, but in most instances ample and rapid control will be obtained with the adjustment already described, particularly if care is taken to prevent air leakage in ash-pit.

Care should be taken to see that draft-damper "B" is always tightly closed when damper "A" is opened to the fullest extent.

NOTE: To obtain most economic operation, care should be taken to properly seal, by putty or cement, space between base and floor, and boiler sections and base (see paragraph "Leakages" on page 14).

The Chimney

The chimney has been frequently referred to as the pulse of the heating system and it may be said that there is hardly any one part of the plant which contributes so much to the success or failure of the installation as the chimney. In view of the chimney's importance, the following fundamentals are briefly outlined:

Three requirements must be met to achieve success: (1) Uniform, smooth and unobstructed interior surface. (2) Proper area and height. (3) Freedom from leaks from top to bottom.

The size and height of the chimney recommended by the boiler manufacturer should always be complied with as nearly as possible.

(a) The top of a chimney should extend at least three feet above flat roofs and at least two feet above the ridge of a peaked roof. It should not be located adjacent to buildings or trees higher than itself as eddies may be formed, which might tend to eliminate the draft.

(b) Chimneys built inside the house are not subject to as large a heat loss as outside chimneys, and are therefore more efficient. Chimneys built into outside walls should have thicker walls in order to decrease the heat loss.

(c) The chimney walls should never be less than 8 inches thick unless the flues are lined the full length with fire clay flue lining, and proper precautions have been taken to adequately protect nearby inflammable materials.

(d) The chimney should be constructed as straight as possible to avoid offsets. Offsets mean increased resistance and reduce the chimney efficiency. Soot, mortar, etc., may accumulate in offsets and bends and greatly reduce its working area. Where offsets are unavoidable they should be made gradual.

(e) All joints in the brickwork and lining must be carefully filled with mortar or cement so that the inner chimney surface is smooth. It has been found that cemented chimneys give better results than those using mortar.

(f) The draft in a chimney is spiral and therefore round chimneys or those as nearly square as possible are most effective.

(g) No other equipment should be connected to a chimney to which a heating boiler is connected. In this respect the chimney may be likened to a person trying to smoke a cigarette if the paper has been punctured.

(h) Do not let the boiler smokepipe extend into the chimney as this impairs the draft. Smokepipe should be flush with inner chimney wall.

(i) Provision should be made for a soot pocket at the base of every flue, which is accessible by means of a well fitting clean-out door. The top of the door should be placed close to the smokepipe connection.

(j) The chimney top should not be capped by any device which will make the area of its outlet less than the area of the flue.

(k) Avoid leaks around smokepipe where it joins boiler and chimney. All joints should be carefully sealed with boiler putty or asbestos cement.

Of Vital Importance to All Boiler Owners

Lengthening the Life of Heating Boilers

Theoretically a well designed heating boiler should last indefinitely under normal operation and barring abuse. Normal operation assumes that reasonable care and attention shall be provided and unit shall not be forced at a destructive rate.

Proper adjustment of all parts should be afforded and the boiler kept in good condition, as required by any high class mechanical apparatus. One would not expect to obtain perfect performance and long service from a fine automobile without the benefit of frequent inspections and constant care, and this practice applies equally to the heating apparatus.

Boilers should be kept clean, both on the fire side and the water side, as in this feature lies the greatest determining factor affecting the life of the unit.

Corrosion is the deadly enemy of all fuel-burning devices, and especially heating boilers, and corrosion acts principally during the summer or idle period when the boiler is cold. Due to the fact that most boilers are located in the basement where the air is likely to be cooler than outside during the summer, condensation forms in the gas passages, and this in combination with any soot which may be present results in the formation of sulphurous acid which corrodes or rusts the metal.

The above conditions are destructive alike to steel, cast iron, copper or brass, although the process is least rapid in the case of cast iron.

Most cast iron sectional boilers are held together by long bolts or tie-rods running the full length of the boiler with washers and nuts at either end. Certain types are provided with short tie-rods for each section, and still others are assembled by means of cast headers at top and bottom, each section being connected to the headers by means of screwed steel nipples. However, in all cases the action of corrosion between sections is the same and produces the same results.

The majority of all breakages in cast iron sectional boilers is traceable to excessive tension on the tie-rods. This may occur through leaving the rods too tight at the time the boiler is erected, or may be caused by the action of corrosion between sections, which tends to force them apart. This action takes up any slack in the tie rods and they soon become extremely tight. If this condition is allowed to continue, broken sections will inevitably result. Front and rear sections are generally broken first as it is on these parts that the greatest pressure is exerted.

Corrosion develops in some boilers much faster than in others due to the fact that some basements are much cooler than others, thereby causing more condensation; furthermore, some owners are more particular than others in keeping their boilers clean.

If the above described conditions should result in a broken section it will be unwise merely to replace the section, as the damage is sure to recur—probably the succeeding season. The only safe procedure is to completely disassemble all sections, clean off all corrosion, then reassemble again, with a new section, using spring washers and brass safety nuts under tie bolt heads, and leaving the tie-bolt nuts tightened with the fingers only, and without the use of a wrench.

To those owning heating boilers or responsible for their care and satisfactory operation, we would recommend the following procedure:

Spring Attention

1. Keep flues and all other parts clean at all times, and when discontinuing use for the summer carefully and thoroughly clean all flues, firebox or any part coming in contact with hot gases.

2. After cleaning flues, spray thoroughly with light lubricating oil, using oil gun with extended stem bent at end so as to facilitate reaching all corners and narrow places. Oil used need not be expensive—crank case rejections will suffice. Oil all doors and door bearings, damper bearings, and regulator parts.

3. Steam boilers—allow water to remain and add sufficient water to fill to safety valve. In the case of warm water boiler, leave water alone.

4. Open fire doors, cleanout doors, and ashpit doors. Thoroughly clean smokepipe and chimney. Leave smokepipe off, if desired.

5. Make sure all tie-rods are *tested and left loose*. If not so equipped, install spring washers and brass safety nuts under heads of all tie-rods. (These will be furnished at nominal cost by us.)

Fall Attention

1. Draw off all water from system—flush out thoroughly to remove sediment and dirt. Clean all return lines as well as boiler. When system is clean fill with fresh water to prescribed water line, if steam or vapor system. In the case of a warm water system fill to proper level at expansion tank, also remove air from all radiators.

2. Carefully inspect all control devices and see that they are properly adjusted and functioning. Fuel is often wasted due to improper operation of automatic control apparatus. After an idle period, controls may stick or operate slowly due to corrosion of moving parts, accumulation of dust, or dry bearings.

The failure of air valves to function properly on a one-pipe steam heating system is frequently due to dirt accumulations in the delicate working parts. Therefore when radiators do not heat properly, try cleaning them with "Airigator," a product designed specially for the purpose. Your heating contractor can furnish it.

3. Inspect boiler for air leaks. (See page 14.)

If Boiler Is Not to Be Used During the Winter

If a boiler is not used during the winter, it is advisable to drain it. A boiler not in use, containing water in cold weather, may freeze, causing breakage.

Clean Boiler Internally

To obtain the most satisfactory results a CLEAN BOILER is ABSOLUTELY NECESSARY. The cleaning of your boiler is best done by your heating contractor. We recommend the use of Vinco Boiler Cleaner immediately following installation and annually thereafter. Caution: Do not use as a cleansing agent soda, or any alkali, vinegar, or any acid in the boiler. It is essential to follow the instructions of the manufacturer, and in obstinate cases to obtain the recommendations of their laboratories.

In addition to above cleaning operation, it may become necessary to blow off the boiler in order to remove foreign matter that affects its performance. This task should be cared for by your heating contractor, who is qualified to do the work in accordance with accepted practice.

Automatically Fired Boilers

While the previous pages have dealt primarily with hand fired boilers, many of the recommendations made are equally applicable to automatically fired boilers. We draw particular attention to the following paragraphs and pages:

- Page 12—"Steam Boilers"
- Page 13—"Water Boilers"
- Page 14—"Leakages"
- Page 24—"The Chimney"
- Page 25—"Of Vital Importance to all Boiler Owners"
- Page 27—"Spring Attention"
- Page 28—"Fall Attention"
- Page 28—"If Boiler is not to be used during the Winter"
- Page 28—"Blowing off the Boiler"
- Page 29—"Cleaning Boiler Internally"

As far as the operation of the firing device itself is concerned, this is the subject of special instructions furnished by the manufacturers of the unit.

Arco Accessories Make Any Heating System Better

The best boiler and radiator combination may be handicapped in delivering fullest satisfaction by inferior valves, vents, regulators, etc. Arco Accessories are especially designed to insure highly desirable operation of heating systems by increasing their efficiency in operation and giving the utmost in comfortable and convenient heating.

Arco Packless Radiator Valves



No. 999
Arco Packless
Radiator Valve

For steam, hot water, vapor or vacuum heating. Arco Packless Valves *cost you less* in the long run by avoiding the periodic expense of repacking found with old-style valves. They never leak and never need repacking. They open and close with one smooth turn of a handle that never gets hot and are smart in appearance as well. Packless Valves are part of the complete system.



No. 901
Arco Packless
Radiator Valve

Ideal Fast Venting System



No. 300
Arco-Detroit
Multiport

The latest development in the science of venting is the Ideal Fast Venting System. It is a necessity for providing uniform heat with automatically fired one-pipe steam systems having oil burners, gas burners or stokers, and it also vastly improves the performance of hand-fired coal burning heating systems.

Especially with automatic firing does the problem of venting take on new significance for, in order to get proper heating in every room, both the mains and radiators must be vented every time the burner operates, and this venting and heating must be accomplished before the burner stops. This is practically impossible with ordinary valves because the thermostat that controls burner is usually located in a room close to boiler where the temperature rises quickly and checks the burner before the remote radiators are vented or heated.

With the Ideal Fast Venting System, however, the opening or port of each valve can be adjusted to permit smaller openings on radiators close to boiler and larger openings on remote radiators, so that they all vent and heat equally fast, and assure the balance which means positive uniform heating, each time the burner operates.

The Ideal Fast-Venting System is applicable to any one-pipe steam system, old or new. It includes Arco-Detroit Multiport Air Valves for radiators, illustrated at left and the No. 861 Arco-Detroit Hurivent for mains shown at right.



No. 861
Arco-Detroit
Hurivent

Ideal Variport Valves



No. 5150
Ideal Variport

No. 5150 Ideal Variport Valve likewise has the adjustable vent port with added special features designed for vacuum systems. Permits free escape of all air but prevents its return, creating a partial vacuum in the system and enabling radiators to retain their heat longer. The retention of vacuum during carry-over periods, with intermittent automatic firing, effects economy.

For further information on American Radiator Heating Systems see your local heating contractor, or write direct to American Radiator & Standard Sanitary Corporation, 40 West 40th Street, New York, N. Y., or Bessemer Bldg., Pittsburgh, Pa.

